TRIODE-FRAME OUTPUT PENTODE

Triode-pentode with separate cathodes. Triode intended for use as frame oscillator or pulse amplifier.
Pentode intended for use as frame output tube.

QUICK REFERENCE DATA				
Triode section				
Anode current	I_a		10.5	mA
Transconductance	S		7	mA/V
Amplification factor	μ		63	-
Cathode peak current	I_{k_p}	max.	150	mA
Pentode section				
Anode peak voltage	V_{a_p}	max.	2	kV
Cathode current	I_k	max.	75	mA
Anode dissipation	W_a	max.	8	W

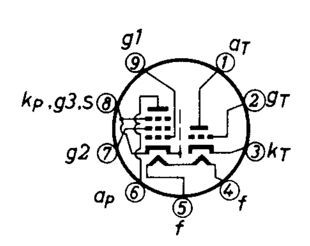
HEATING: Indirect by A.C. or D.C.; series supply

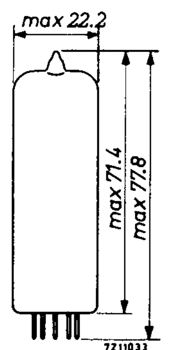
Heater current	I_f	300	mA
Heater voltage	V_f	17.5	V

DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Noval





CAPACITANCES

Grid triode to anode pentode	$C_{g_T a_p}$	max.	0.05	pF
Grid triode to heater	$C_{g_T f}$	max.	0.15	pF
Grid No. 1 pentode to anode pentode	$C_{g_{1p} a_p}$	max.	1.0	pF
Grid No. 1 pentode to anode triode	$C_{g_{1p} a_T}$	max.	0.08	pF
Grid No. 1 pentode to heater	$C_{g_{1p} f}$	max.	0.20	pF

TYPICAL CHARACTERISTICS

Triode section

Anode voltage	V_a	100	100	V
Grid voltage	V_g	-0.85	0	V
Anode current	I_a	5	10.5	mA
Transconductance	S	5.5	7.0	mA/V
Amplification factor	μ	60	63	-
Internal resistance	R_i	11	9	kΩ

OPERATING CHARACTERISTICS

Pentode section

Frame output application

Anode voltage	V_a	50	65	V
Grid No. 2 voltage	V_{g_2}	170	210	V
Grid No. 1 voltage	V_{g_1}	-1	-1	V
Anode peak current	I_{a_p}	200	285	mA
Grid No. 2 peak current	$I_{g_{2p}}$	35	45	mA

Remarks

The minimum I_{a_p} value to be expected as a result of spread of the tube characteristics, tube deterioration during life and decrease of the mains voltage to 10% below the nominal value, can be derived from the curves on page 9 by decreasing by 40% the I_a values of curve A-B at the V_{g_2} value occuring at the decreased mains voltage.

In order not to exceed the maximum permissible value of W_{g_2}, the circuit should be designed such that at a mains voltage of 10% below nominal, V_a at the end of scan will not be lower than the value determined by curve A-B at the relevant V_{g_2} value.

HUM

The equivalent pentode grid hum voltage without negative feedback is max. 10 mV when Z_{g_1} (at f = 50 Hz) ≦ 0.5 MΩ, C_{g_1-f} = 0.2 pF and V_{kf} = 150 V_{RMS}.

LIMITING VALUES (Design centre rating system)

Triode section

Anode voltage	V_{a_o}	max.	550	V
	V_a	max.	300	V
Anode dissipation	W_a	max.	0.5	W
Cathode current				
average	I_k	max.	15	mA
peak	I_{k_p}	max.	150	mA [1]
peak	I_{k_p}	max.	100	mA [2]
Grid resistor				
for fixed bias	R_g	max.	1	MΩ
for automatic bias	R_g	max.	3.3	MΩ
Cathode to heater voltage	V_{kf}	max.	200	V [3]

Remark

A cathode peak current of 100 mA will be available throughout life and at underheating.

[1] Max. pulse duration 2% of a cycle with a maximum of 400 μsec.

[2] Max. pulse duration 4% of a cycle with a maximum of 800 μsec.

[3] During warming up the D.C. component of V_{kf} = max. 315 V, k pos.

LIMITING VALUES (continued)

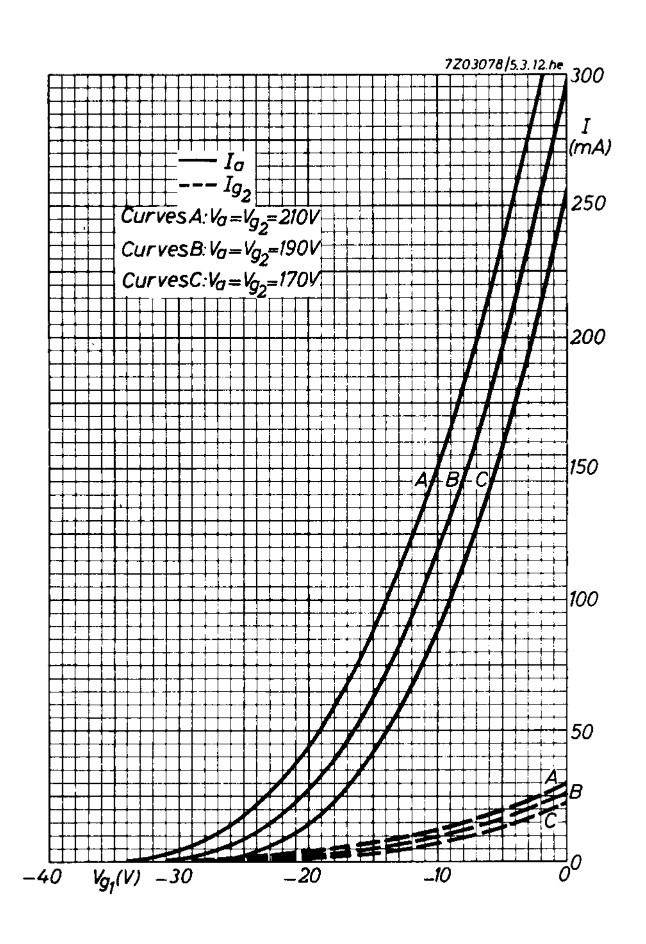
Pentode section

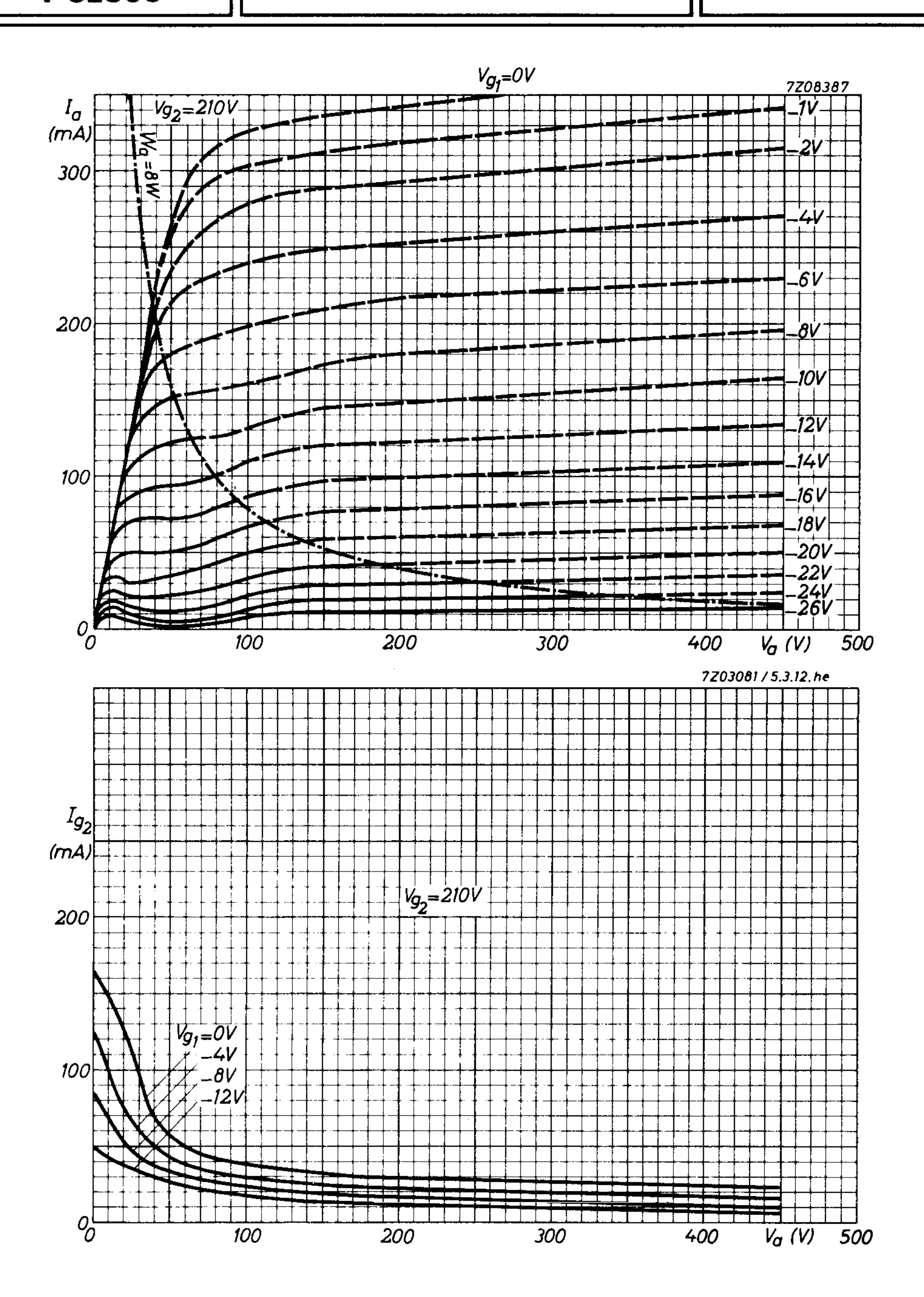
Anode voltage	V_{a_o}	max.	550	V
	V_a	max.	300	V
Anode peak voltage	V_{a_p}	max.	2	kV [1]
Grid No.2 voltage	$V_{g_{2o}}$	max.	550	V
	V_{g_2}	max.	250	V
Anode dissipation	W_a	max.	8	W [2]
Grid No.2 dissipation	W_{g_2}	max.	1.5	W [3]
Cathode current	I_k	max.	75	mA
Grid No.1 resistor				
for fixed bias	R_{g_1}	max.	1.0	MΩ
for automatic bias	R_{g_1}	max.	2.2	MΩ
Cathode to heater voltage	V_{kf}	max.	200	V

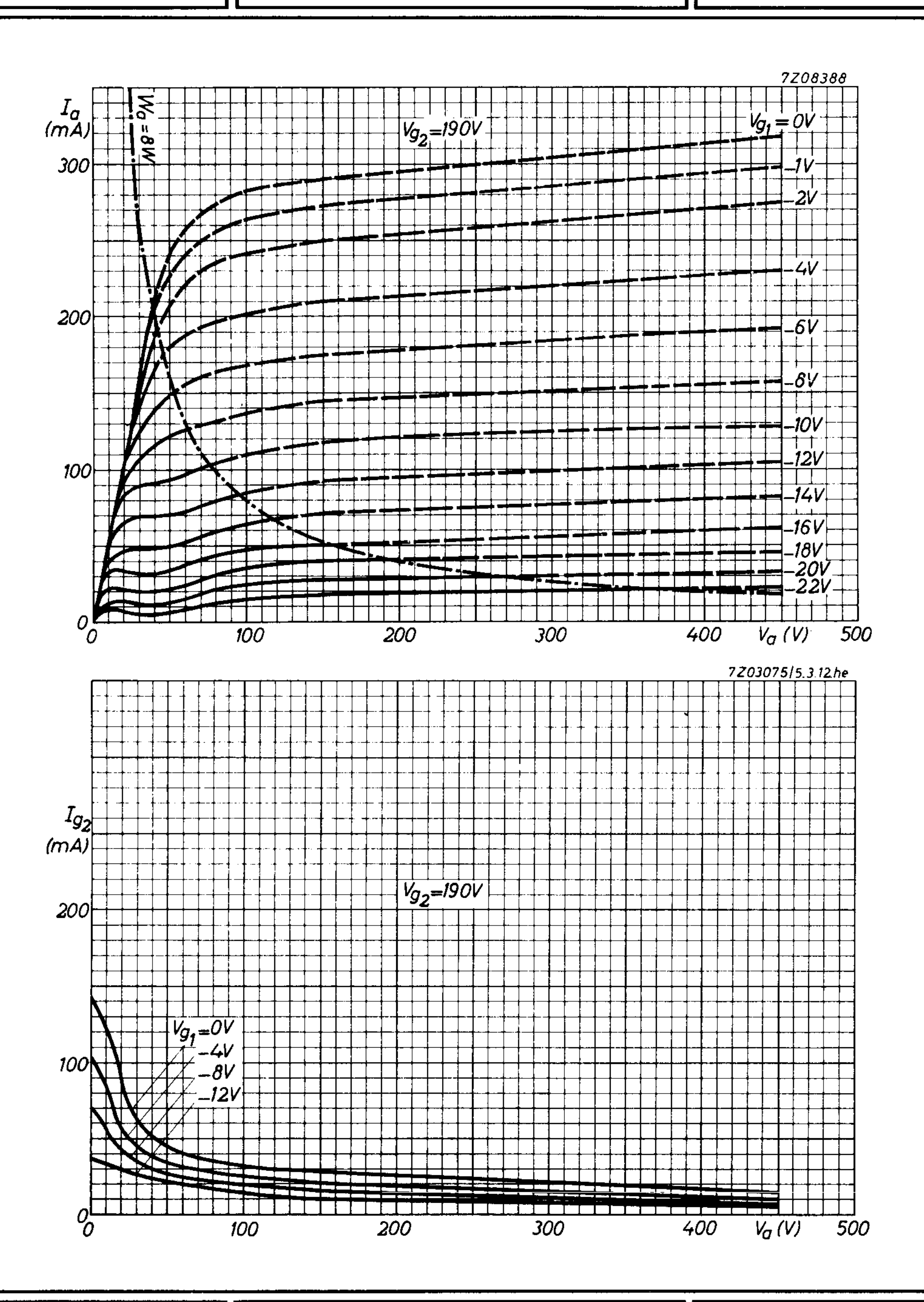
[1]) Max. pulse duration 5% of a cycle with a maximum of 1 ms.

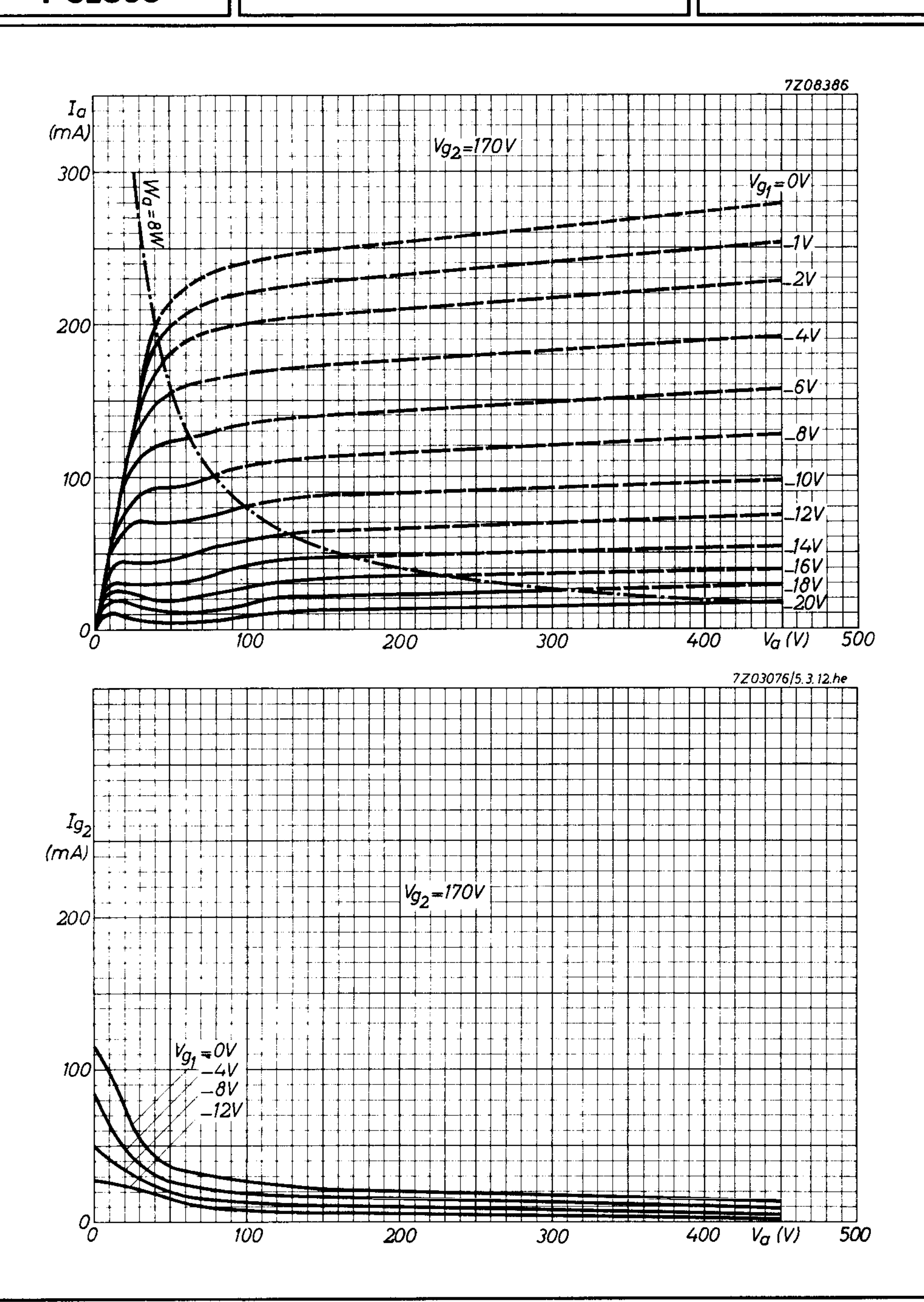
[2]) For a nominal tube at the worst probable operating conditions and at normal picture height W_a should not exceed 10.5 W.

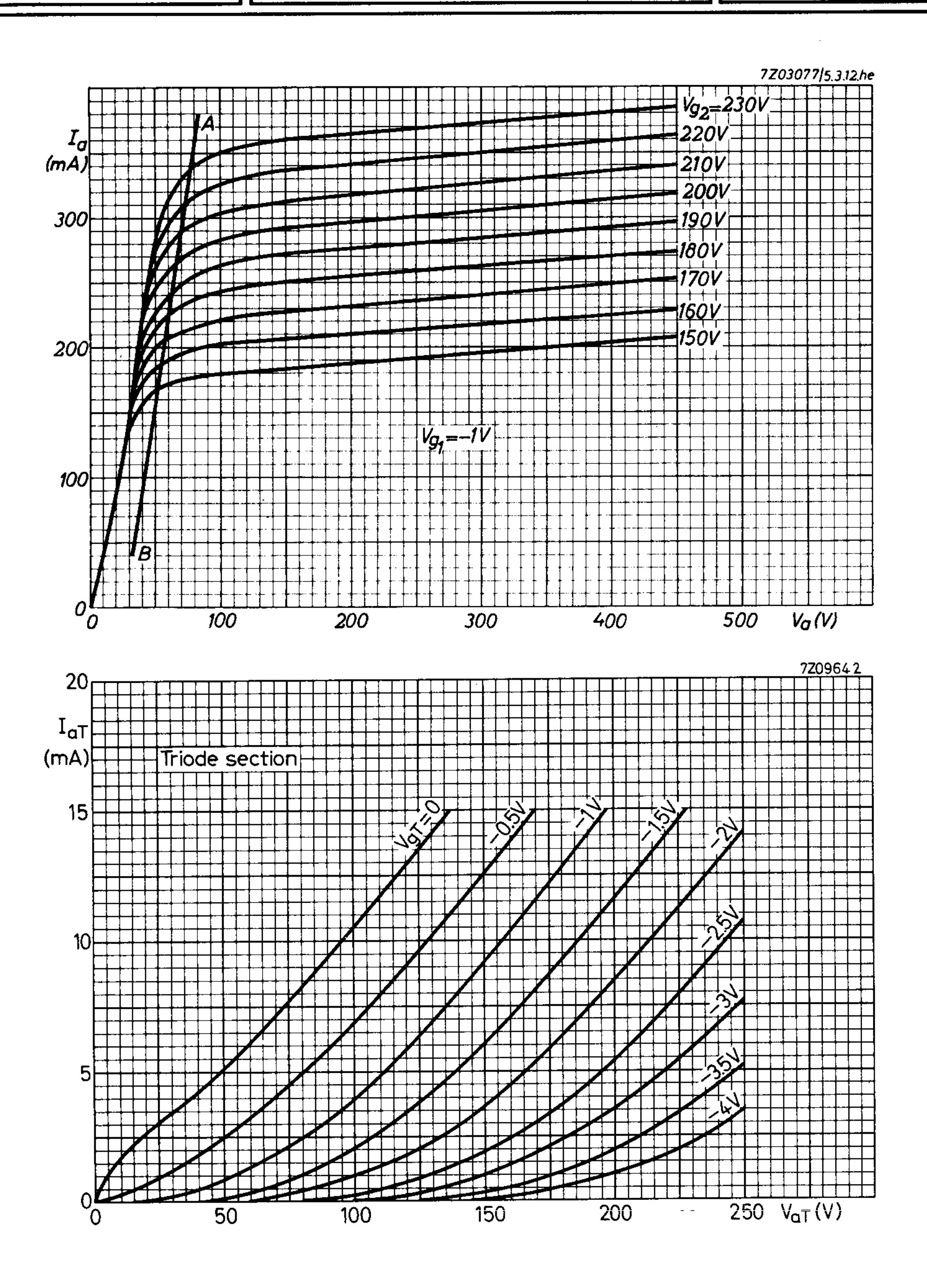
[3]) For a nominal tube at the worst probable operating conditions and at normal picture height W_{g_2} should not exceed 2 W.

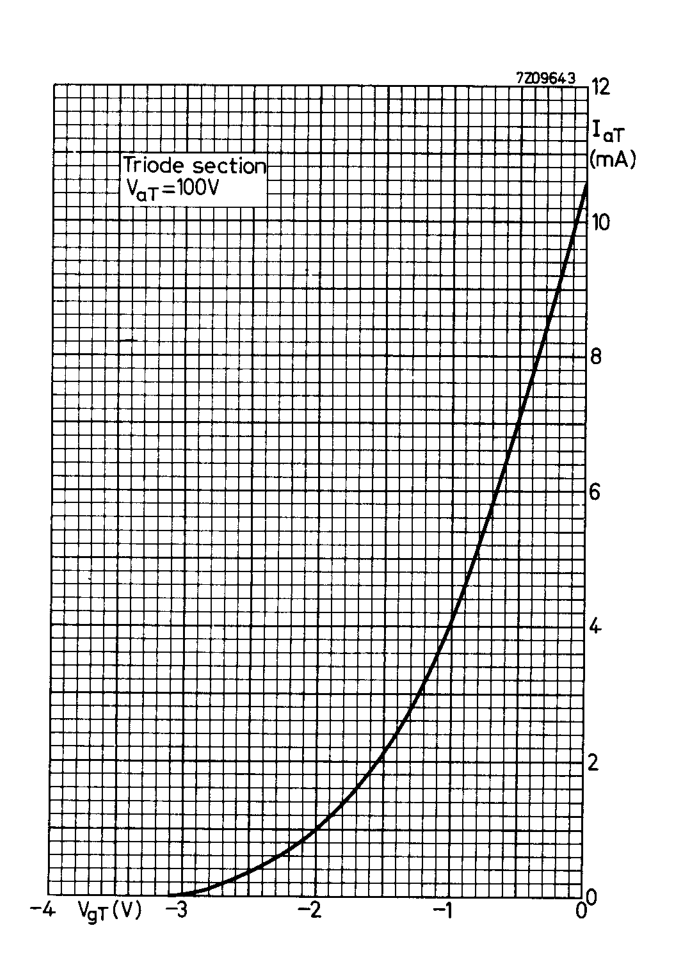

7Z03078/5.3.12.he
300
I
(mA)
250
200
150
100
50
0
Ia
Ig2
Curves A: Va=Vg2=210V
Curves B: Va=Vg2=190V
Curves C: Va=Vg2=170V
A
B
C
−40
Vg1(V)
−30
−20
−10
0


7Z08387
V_{g_1}=0V
V_{g_2}=210V
W_a=8W
I_a (mA)
-1V
-2V
-4V
-6V
-8V
-10V
-12V
-14V
-16V
-18V
-20V
-22V
-24V
-26V
V_a (V)
7Z03081 / 5.3.12.he
I_{g_2} (mA)
V_{g_2}=210V
V_{g_1}=0V
-4V
-8V
-12V
V_a (V)


7Z08388
I_a (mA)
$W_a = 8W$
V_{g_2}=190V
V_{g_1}=0V
-1V
-2V
-4V
-6V
-8V
-10V
-12V
-14V
-16V
-18V
-20V
-22V
0
100
200
300
400
500
V_a (V)
7Z03075/5.3.12.he
I_{g_2} (mA)
V_{g_2}=190V
V_{g_1}=0V
-4V
-8V
-12V


7Z08386
I_a (mA)
V_{g_2}=170V
V_{g_1}=0V
-1V
-2V
-4V
-6V
-8V
-10V
-12V
-14V
-16V
-18V
-20V
W_a=8W
300
200
100
0
0
100
200
300
400
V_a (V)
500
7Z03076/5.3.12.he
I_{g_2} (mA)
V_{g_2}=170V
V_{g_1}=0V
-4V
-8V
-12V
200
100
0
0
100
200
300
400
V_a (V)
500


7Z03077/5.3.12.he
I_a (mA)
V_{g2}=230V
220V
210V
200V
190V
180V
170V
160V
150V
A
B
V_{g1}=−1V
0
100
200
300
400
500
V_a (V)
7Z0964 2
I_{aT} (mA)
Triode section
V_{gT}=0
−0.5V
−1V
−1.5V
−2V
−2.5V
−3V
−3.5V
−4V
0
5
10
15
20
50
150
250
V_{aT} (V)


7Z09643
Triode section
V_{aT}=100V
I_{aT}
(mA)
12
10
8
6
4
2
0
−4
V_{gT} (V)
−3
−2
−1
0



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9	9	1968.09
10	10	1968.09
11	FP	1999.08.02